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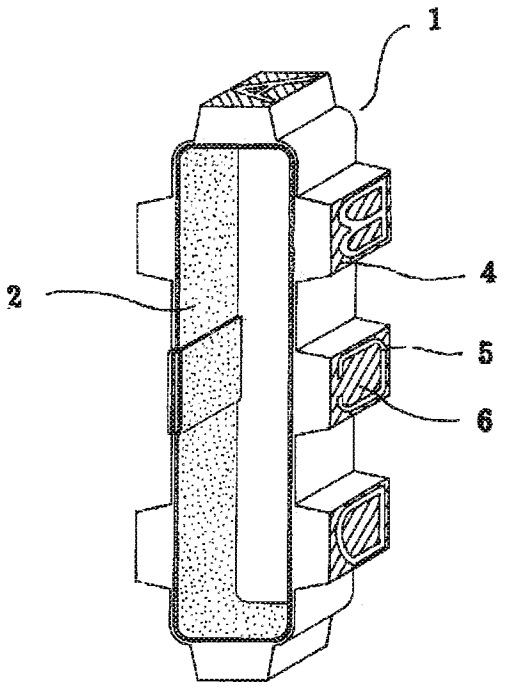
(54)【発明の名称】　回転印用無端印字ベルト

(57)【要約】

【課題】　無端印字ベルトの多孔体に熱可塑性物質を用いる場合、最も優れた基材を選定することを目的として発明されたものであり、更に、一旦製造した後にも関わらず改めて印字部を形成することのできる無端印字ベルトを提供することも目的とする。

【解決手段】　ホットメルトシートを基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルト、また、補強材の上にホットメルトシートをのせて基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルト、及び、それらの製造方法。



【特許請求の範囲】
【請求項１】　ホットメルトシートを基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルト。
【請求項２】　補強材の上にホットメルトシートをのせて基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルト。
【請求項３】　熱可塑性物質に少なくとも水溶性気泡形成剤を加えて混練したうえ板状に形成したシートを１００℃～２００℃に加熱し、台座のみを彫刻した型に前記加熱しておいたシートをセットし、その上に基材をのせ、更に押し板をのせて成型し、離型した後前記水溶性気泡形成剤を洗い出し、乾燥させた後前記台座上に非多孔体保護被膜による非印字部を形成し、シートの両端を重ね合わせて熱シール機にて熱融着し、これを裁断して得られる請求項１乃至請求項２の回転印用無端印字ベルトの製造方法。
【請求項４】　熱可塑性物質に少なくとも水溶性気泡形成剤を加えて混練したうえ板状に形成したシートを１００℃～２００℃に加熱し、台座のみを彫刻した型に前記加熱しておいたシートをセットし、その上に基材をのせ、更に押し板をのせて成型し、離型した後前記水溶性気泡形成剤を洗い出し、乾燥させた後シートの両端を重ね合わせて熱シール機にて熱融着し、前記台座上に非多孔体保護被膜による非印字部を形成して得られる請求項１乃至請求項２の回転印用無端印字ベルトの製造方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、インク内蔵タイプの回転印に使用する多孔体を用いた無端印字ベルトに関するものである。
【０００２】
【従来の技術】特開昭５４－１０３１２７や特開昭５４－１１８２１０等に開示されている連続気泡を有する多孔体を印字部に用いた無端印字ベルトからなる回転印は、自分自身にインクを内蔵できるので、使用の度にインクを付着させなくても連続して押印することができ大変有用である。従来、このような無端印字ベルトの多孔体には主にスポンジ化したゴムが用いられると共に、ゴムの強度を補完するための基材には主に綿布が用いられているが、前記多孔体を熱可塑性物質等の他の物質に変更したものはほとんど見られなかった。それは、ポリエチレン、ポリプロピレン等の熱可塑性物質は綿布との接着性が非常に悪いので、前記無端印字ベルトに用いた場合は実用に耐えられない問題があったためと思われる。また、従来の回転印の無端印字ベルトは、無端印字ベルトを成型する際に文字、図形、記号、絵柄等の印字部も同時に成型する方法が一般的であり、よって、金型等の型には台座（マウント）と印字部を二段に彫刻したものが使用されている。しかし、この方法では、あらかじめ所要する文字、図形、絵柄等を型に彫り込んでおかなければならず、無端印字ベルトを製造した後に文字等を追加して形成することはできなかった。
【０００３】
【発明が解決しようとする課題】そこで、本発明は無端印字ベルトの多孔体に熱可塑性物質を用いる場合、最も優れた基材を選定することを目的として発明されたものであり、更に、一旦製造した後にも関わらず改めて印字部を形成することのできる無端印字ベルトを提供することも目的としている。
【０００４】
【課題を解決するための手段】ホットメルトシートを基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルト。また、補強材の上にホットメルトシートをのせて基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルト。熱可塑性物質に少なくとも水溶性気泡形成剤を加えて混練したうえ板状に形成したシートを１００℃～２００℃に加熱し、台座のみを彫刻した型に前記加熱しておいたシートをセットし、その上に基材をのせ、更に押し板をのせて成型し、離型した後前記水溶性気泡形成剤を洗い出し、乾燥させた後前記台座上に非多孔体保護被膜による非印字部を形成し、シートの両端を重ね合わせて熱シール機にて熱融着し、これを裁断して得られる回転印用無端印字ベルトの製造方法。また熱可塑性物質に少なくとも水溶性気泡形成剤を加えて混練したうえ板状に形成したシートを１００℃～２００℃に加熱し、台座のみを彫刻した型に前記加熱しておいたシートをセットし、その上に基材をのせ、更に押し板をのせて成型し、離型した後前記水溶性気泡形成剤を洗い出し、乾燥させた後シートの両端を重ね合わせて熱シール機にて熱融着し、前記台座上に非多孔体保護被膜による非印字部を形成して得られる回転印用無端印字ベルトの製造方法。
【０００５】
【発明の実施の形態】以下、本発明を詳細に説明する。本発明は、ホットメルトシートを基材とし、前記ホットメルトシート上に熱可塑性多孔体からなる台座を成型してなる回転印用無端印字ベルトにおいて、前記台座上に非多孔体保護被膜による非印字部を形成した無端印字ベルトである。本発明に用いる基材には、５０℃～１８０℃で融解する熱可塑性樹脂からなるホットメルトシートを用いることができる。材質としては、例えばポリエチ

レン、ポリプロピレン、塩化ビニルなどを用いることができるが、特に、ポリエチレンが好ましく用いられる。本発明のホットメルトシートには、無端印字ベルトの成型時の不良を防止するために、延伸性をかけずにシート化した熱によって収縮しないホットメルトシートを用いる。また、本発明のホットメルトシートには、非多孔体又は多孔体のどちらのシートでも使用することができる。非多孔体のシートを用いた場合は、無端印字ベルトの裏側からインキを供給することができないので印字部表面からインキを供給することとなり、多孔体のシートを用いた場合は、無端印字ベルトの裏側からでも印字部表面からでもインキを供給することができるようになる。成形性・接着性・インキ浸透性の観点から本発明において特に好ましい基材は目付け10～30g／$m^2$、厚さ0．05～0．50mm、網穴間1～2mmの格子状網目構造をもつポリエチレンのホットメルトシートである。本発明の台座には、熱可塑性多孔体を用いる。材質としては主に50℃～180℃で融解する熱可塑性樹脂が用いられ、例えばポリエチレン、ポリプロピレン、塩化ビニルなどを用いることができるが、特に、ポリエチレンが好ましく用いられる。本発明では、連続気泡を有する多孔体を得るために、熱可塑性樹脂に少なくとも塩化ナトリウムや塩化カルシウム等の水溶性気泡形成剤を加えて混練したものを成型した後、前記水溶性気泡形成剤を洗い出して多孔体化する。多孔体を製造する際には、水溶性気泡形成剤以外にカーボンブラックなど赤外線を吸収して発熱する発熱材微粉末を加えて混練してもよい。多孔体とするには熱可塑性樹脂に発泡剤を混ぜて連続気泡を形成する方法もあるが、均一な大きさでかつ連続した気泡を得られにくいので好ましくない。なお、本発明では台座だけを彫刻し、文字、記号、図形、絵柄等の印字部を彫刻していない型を用いる。よって、成型したシートは台座だけが形成され印字部が全く形成されない。

【0006】そこで、前記台座に印字部を形成するには、所要の文字等を黒地とし余白を透明地で表したポジフィルムや所要の文字等を透明地とし余白を黒地で表したネガフィルムを前記台座に重ね、前記フィルム側から赤外線を照射し、余白に対応する部分を溶融固化させてインキが滲み出し不能な非多孔体保護被膜で非印字部を形成すると共に、文字等に対応する部分をインキ滲み出し可能に残存して印字部を形成する。この際、熱可塑性多孔体が赤外線を吸収して発熱する発熱材微粉末を含んでいるものの場合はポジフィルムを用い、発熱材微粉末を含んでいないものの場合はネガフィルムを用いて文字等を形成する。この赤外線照射による文字等作成方法は、特公昭53－43321、特開平6－155698、特開平8－72376、特願平8－272200などで既に公知技術となっている。また、他の印字部形成方法として、印字部が形成されていない無端印字ベルトを従来公知の回転印に組み込んだ後、所要の文字等を彫り込んだ型を80℃前後に加熱し、この型の上を無端印字ベルトを回転させながら回転印を移動させ、文字等以外の余白に対応する部分を溶融固化させてインキが滲み出し不能な非多孔体保護被膜で非印字部を形成すると共に、文字等に対応する部分をインキ滲み出し可能に残存して印字部を形成する方法もある。いずれにしても、当初は文字等が形成されていない台座のみの無端印字ベルトを製造しておけば、あとから必要時に必要な数量だけ所要する文字等を形成した無端印字ベルトを得ることができるので、無駄な完成品の在庫を保有しておく必要がない。

【0007】本発明の無端ベルトは次のように製造する。ポリエチレンなどの熱可塑性物質に少なくとも塩化ナトリウムや塩化カルシウム等の水溶性気泡形成剤を加え、これに必要に応じてカーボンブラックなどの発熱材微粉末を加えて混練したうえ板状に成形したシートを100℃～200℃に加熱し、台座のみを彫刻した型に前記加熱しておいたシートをセットし、その上に基材をのせ、更に押し板をのせて成型し、離型した後前記水溶性気泡形成剤を洗い出し、乾燥させた後前記台座上に前記方法にて非多孔体保護被膜による非印字部を形成し、シートの両端を重ね合わせて熱シール機にて熱融着し、これを裁断して製造する、または、乾燥させた後シートの両端を重ね合わせて熱シール機にて熱融着し、これを必要幅に裁断した後前記台座上に前記方法にて非多孔体保護被膜による非印字部を形成して製造する。本発明では上述の通り、水溶性気泡形成剤を加えて板状に成型したシートを加熱して印字ベルトを製造する。よって、型を全く加熱しない或いは低温に保熱すればよく型を高温に加熱する必要がないので、型の高温度制御装置などが不必要となり製造装置を簡略化できる上、型の材質も金属以外にフェノール板など融点が200℃以上のものであれば特に制限されることなく何でも使用できる。なお、水溶性気泡形成剤を加えて板状に成形したシートを100℃～200℃に加熱するのは、当該シートをできるだけ軟化させて成型性をよくするためである。ここで、当該シートは水溶性気泡形成剤を加えてあるためと思われるが、160℃に加熱しても融解しない。加熱方法は、ホットプレートにのせたり、マイクロウエイブで熱したりする方法がとられ、当該シート全体を熱する方法であれば特に限定されない。本製造方法では、水溶性気泡形成剤を洗い出した後のシートの両端を重ね合わせて熱シール機にて熱融着するが、材質がゴムのような熱硬化性樹脂でなく熱可塑性樹脂であるので、特別な接着剤は必要なく、そのまま熱融着できる利点がある。

【0008】また、前述の回転印用無端印字ベルトの基材を、ホットメルトシートを補強材で補強すれば、更に良好な無端印字ベルトが得られる。補強材には、主に綿、絹、レーヨン、ナイロン、ポリエステルなどの繊維

を平織りや綾織りした布を用いることができ、極微細繊維といわれる繊度１ｄ以下の合成繊維から繊度１００ｄ以上の天然繊維までを使用した様々な布を用いることができる。ホットメルトシート及び熱可塑性多孔体は、前述したものと同じものが使用でき、この際ホットメルトシートは、基材として作用するのは当然であるが、合成繊維だけでなく綿などの天然繊維とも強固に接着するので補強材と熱可塑性多孔体との接着剤としても作用する。

【０００９】

【実施例】以下、本発明を実施例によって詳細に説明する。実施例１を図１に示す。２は基材であって、７０℃で融解する厚さ０．２ｍｍの多孔体ポリエチレンからなるホットメルトシートを用いている。当該ホットメルトシートには、延伸性をかけずにシート化してあり熱によって収縮しないものを選択する。これによって、無端印字ベルトの成型時の不良を防止することができる。４は台座であって、７０℃で融解する多孔体ポリエチレンを用いている。前記台座４には、印字部５、非印字部６が形成してあり、前記非印字部６は文字等以外の余白に対応する部分の多孔体ポリエチレンを溶融固化させてインキが滲み出し不能な非多孔体保護被膜に形成して得られ、前記印字部５は文字等に対応する部分を溶融固化せずインキ滲み出し可能に残存して形成する。多孔体ポリエチレンを溶融固化させることによって、印字部５と非印字部６との高さの差は、０．０１ｍｍ～１．０ｍｍ程度となる。次に、本実施例の製造方法について説明する。まず、ポリエチレン樹脂に塩化ナトリウム微粉末及びカーボンブラックを加えて混練し、厚さ２ｍｍの板状のシートを製造する。次に、この板状のシートをホットプレートで１４０℃に加熱する。次に、台座のみを彫刻した金型に離型剤を塗布し、この中に前記加熱した板状のシートをセットし、その上にポリエチレン多孔体で厚さ０．２ｍｍのホットメルトシートをのせ、更に押し板をのせて２００Ｋｇ／ｃｍ²の圧力をかけながら３０秒間プレス機で成型する。その後、離型して成型後のシートを取り出す。次に、成型後のシートを温水中に浸して塩化ナトリウムを洗い出し完全に塩化ナトリウムを除去できたら乾燥させる。十分に乾燥させた後、所要の文字等を黒地とし余白を透明地で表したポジフィルムを前記台座に重ね、前記フィルム側から赤外線を照射する。そうするとポジフィルムの透明地の部分では赤外線が透過して対応する部分のカーボンを発熱させシートを溶融固化させ非多孔体保護被膜を形成し、また、ポジフィルムの黒地の部分は赤外線によって発熱するが対応する部分の多孔体を溶融するまで温度を伝達させず多孔体のまま残存する。よって、台座はインキ滲み出し可能な印字部とインキ滲み出し不可能な非印字部に形成される。次に、このシートの両端を重ね合わせ、熱シール機にて熱融着する。こうして得られたものを所要の幅に裁断し本実施例の無端印字ベルトを得る。そして、前記無端印字ベルトの基材側からインキを滴下供給し、これを公知の回転印に組み込んで使用する。ここで、７０℃で融解するポリエチレン樹脂に塩化ナトリウム微粉末を加えて板状に成形したシートは、原因の詳細は不明だが１４０℃に加熱しても融解しない。

【００１０】次に、実施例２を図２に示す。２は基材であって、８０℃で融解する厚さ０．５ｍｍの多孔体ポリエチレンからなるホットメルトシートを用いている。当該ホットメルトシートには、延伸性をかけずにシート化してあり熱によって収縮しないものを選択する。これによって、無端印字ベルトの成型時の不良を防止することができる。４は台座であって、８０℃で融解する多孔体ポリエチレンを用いている。前記台座４には、印字部５、非印字部６が形成してあり、前記非印字部６は文字等以外の余白に対応する部分の多孔体ポリエチレンを溶融固化させてインキが滲み出し不能な非多孔体保護被膜に形成して得られ、前記印字部５は文字等に対応する部分を溶融固化せずインキ滲み出し可能に残存して形成する。多孔体ポリエチレンを溶融固化させることによって、印字部５と非印字部６との高さの差は、０．０１ｍｍ～１．０ｍｍ程度となる。３は補強材であって、１２０番手の双糸を縦横１２０本／インチに平織りした綿布を用いている。次に、実施例２の製造方法について説明する。まず、ポリエチレン樹脂に塩化ナトリウム微粉末を加えて混練し、厚さ２ｍｍの板状のシートを製造する。次に、この板状のシートをホットプレートで１４０℃に加熱する。次に、台座のみの印字部を彫刻した金型に離型剤を塗布し、この中に前記加熱した板状のシートをセットし、その上にポリエチレン多孔体で厚さ０．５ｍｍのホットメルトシートをのせ、その上に１２０番手の双糸を縦横１２０本／インチに平織りした綿布をのせ、更に押し板をのせて２００Ｋｇ／ｃｍ²の 圧力をかけながら３０秒間プレス機で成型する。その後、離型して成型後のシートを取り出す。次に、成型後のシートを温水中に浸して塩化ナトリウムを洗い出し完全に塩化ナトリウムを除去できたら乾燥させる。十分に乾燥させた後、成型後のシートの両端を重ね合わせ、熱シール機にて熱融着する。こうして得られたものを所要の幅に裁断し、回転印に組み込む。次に、所要の文字等を彫り込んだ金型を８０℃前後に加熱し、この上を無端印字ベルトを回転させながら回転印を移動させ、文字等以外の余白部分を溶融固化させてインキが滲み出し不能な非多孔体保護被膜に形成すると共に、文字等の部分のみをインキ滲み出し可能に残存して形成し本実施例の無端印字ベルトを得る。そして、各々の印字部に印字部表面から異なるインキを滴下供給し、これを公知の回転印に組み込んで使用する。ここで、ホットメルトシートは基材として作用するのは当然であるが、綿布とも強固に接着するので、補強材と熱可塑性多孔体との接着剤としても作用す

る。

【００１１】

【効果】本発明は、回転印用無端印字ベルトに熱可塑性物質を用いる場合、基材としてホットメルトを選んだので、長期間使用しても台座が剥離することなく十分に実用に耐えることのできる無端印字ベルトを得ることができた。また、印字部を有さない台座のみを一旦製造し、あとから改めて印字部を形成することのできる無端印字ベルトとしたため、必要時に必要な数量だけ所要する文字等を形成した無端印字ベルトを得ることができるので、無駄な完成品の在庫を保有しておく必要がない。また、本発明では、型を加熱するのではなく、水溶性気泡形成剤を加えて板状に成型したシートを加熱して無端印字ベルトを製造するので、高価な温度制御装置などが必要なく製造装置を簡略化できる上、型自体も融点が２００℃以上のものであれば特に制限されることなく使用できる。本製造方法では、水溶性気泡形成剤を洗い出した後のシートの両端を重ね合わせて熱シール機にて熱融着するが、材質が熱可塑性樹脂であるので特別な接着剤は必要なくそのまま熱融着できる利点がある。

【００１２】

【図面の簡単な説明】

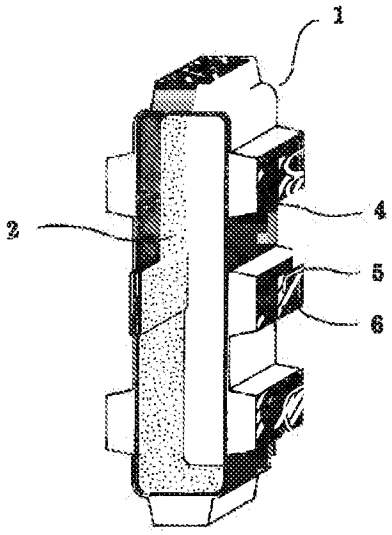
【図１】本発明の実施例１の無端印字ベルト

【図２】本発明の実施例２の無端印字ベルト

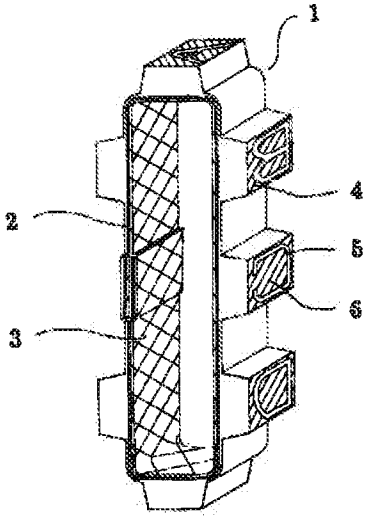
【符号の説明】

1　無端印字ベルト
2　基材
3　補強材
4　台座
5　印字体
6　非印字部

【図１】




【図２】



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# ENDLESS PRINTING BELT FOR A ROTARY STAMP

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Abstract

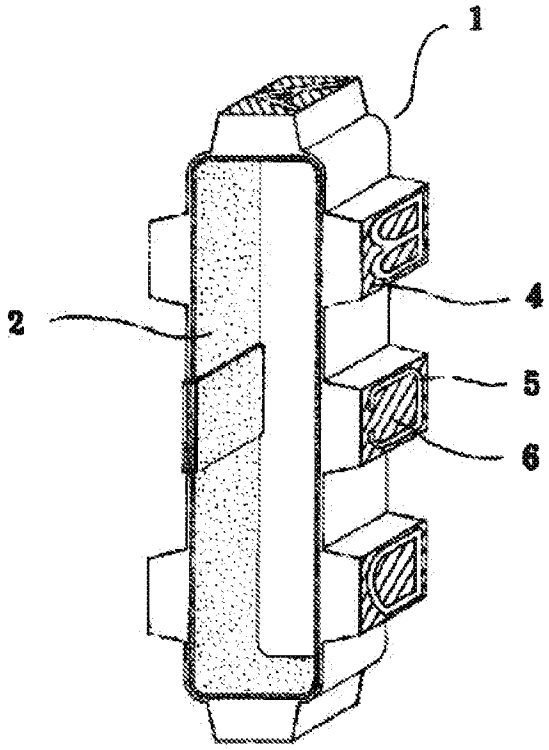
Purpose

The purpose of the present invention is to provide an endless printing belt characterized by the fact that the best base material is selected when a thermoplastic substance is used as the porous body of the endless printing belt, and a printing portion can be re-formed even after the endless printing belt has been manufactured.

Constitution

An endless printing belt and its manufacturing method characterized by the following facts: the endless printing belt for a rotary stamp is prepared by forming a seating member made

of a hot melt sheet as the base material and having a thermoplastic porous member formed on said hot melt sheet; the endless printing belt has a non-printing portion made of a non-porous protective film formed on said seating member; said hot melt sheet is applied as the base material on a reinforcing material; the seating member made of said thermoplastic porous member on said hot melt sheet is molded to form the endless printing belt for a rotary stamp; for this endless printing belt, a non-printing portion is made of the non-porous protective film on said seating member.




Claims

1. An endless printing belt characterized by the following facts: the endless printing belt for a rotary stamp is prepared by forming a seating member made of a hot melt sheet as the base material and having a thermoplastic porous member formed on said hot melt sheet; and the endless printing belt has a non-printing portion made of a non-porous protective film formed on said seating member.

2. An endless printing belt characterized by the following facts: the endless printing belt for a rotary stamp is prepared by forming a seating member made of a hot melt sheet carried on a reinforcing material as the base material and having a thermoplastic porous member formed on

said hot melt sheet; and the endless printing belt has a non-printing portion made of a non-porous protective film formed on said seating member.

3. A manufacturing method of the endless printing belt for a rotary stamp described in Claim 1 or 2, characterized by the following facts: a sheet prepared by forming a blend of a thermoplastic material doped with at least a water-soluble bubble-forming agent to an upper plate shape is heated at 100°C to 200°C; said heated sheet is set in a mold engraved with only the seating member pattern; then, a base material is set, and a pressing plate is applied for molding; after mold releasing, said water-soluble bubble-forming agent is washed out and the unit is dried, forming the non-printing portion made of the non-porous protective film on said seating member; the two ends of the sheet are then superposed and heat fused by a heat sealing machine, followed by cutting to obtain the endless printing belt for a rotary stamp.

4. A manufacturing method of endless printing belt for a rotary stamp described in Claim 1 or 2, characterized by the following facts: a sheet prepared by forming a blend of a thermoplastic material doped with at least a water-soluble bubble-forming agent to an upper plate shape is heated at 100°C to 200°C; said heated sheet is set in a mold engraved with only the seating member pattern; then, a base material is set, and a pressing plate is applied for molding; after mold releasing, said water-soluble bubble-forming agent is washed out and the unit is dried; then, the two ends of the sheet are superposed and are heat fused by a heat sealing machine, forming the non-printing portion made of the non-porous protective film on said seating member.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to an endless printing belt prepared from porous material and for use in ink-containing type rotary stamps.

[0002]

Prior art

Japanese Kokai Patent Application Nos. Sho 54[1979]-103127 and Sho 54[1979]-118210 disclosed a rotary stamp made of an endless printing belt that uses a porous member having consecutive bubbles in it as the printing portion. For this type of rotary stamp, because it contains ink by itself, it can be used to stamp marks continuously without applying ink on it after each round of stamping operation. This is highly useful. In the prior art, the porous member of the endless printing belt is mainly made of spongy rubber, and in order to reinforce the strength of the rubber, cotton cloth is mainly used as the base material. However, in a few cases, thermoplastic materials or the like are adopted as the porous member. It is believed that the cause

might be as follows: polyethylene, polypropylene and other thermoplastic materials have very poor adherence to cotton cloth, so that they cannot withstand the practical application of said endless printing belt. This is undesirable. Also, for said endless printing belt of a rotary stamp, when the endless printing belt is molded, the printing portion of letters, graphics, symbols, patterns, or the like is usually formed at the same time. Consequently, in the dies or other molds, engraving is performed in two steps for the seating member (mount) and printing portion, respectively. However, in this method, because the desired letters, graphics, symbols, patterns, or the like have to be engraved on the dies beforehand, there is no way to add letters, etc., once the endless printing belt has been manufactured.

[0003]

Problems to be solved by the invention

The purpose of the present invention is to solve the aforementioned problems of the prior art by providing an endless printing belt characterized by the fact that when a thermoplastic material is used as the porous member of the endless printing belt, the best base material is selected, and the endless printing belt allows re-formation of the printing portion after manufacturing of the endless printing belt.

[0004]

Means to solve the problems

The present invention provides an endless printing belt characterized by the following facts: the endless printing belt for a rotary stamp is prepared by forming a seating member made of a hot melt sheet as the base material and having a thermoplastic porous member formed on said hot melt sheet; and the endless printing belt has a non-printing portion made of a non-porous protective film formed on said seating member. Also, the present invention provides an endless printing belt characterized by the following facts: the endless printing belt for a rotary stamp is prepared by forming a seating member made of a hot melt sheet carried on a reinforcing material as the base material and having a thermoplastic porous member formed on said hot melt sheet; and the endless printing belt has a non-printing portion made of a non-porous protective film formed on said seating member. In addition, the present invention provides a manufacturing method of the endless printing belt for a rotary stamp characterized by the following facts: a sheet prepared by forming a blend of a thermoplastic material doped with at least a water-soluble bubble-forming agent to an upper plate shape is heated at 100°C to 200°C; said heated sheet is set in a mold engraved with only the seating member pattern; then, a base material is set, and a pressing plate is applied for molding; after mold releasing, said water-soluble bubble-forming agent is washed out and the unit is dried, forming the non-printing portion made of the non-

porous protective film on said seating member; the two ends of the sheet are then superposed and heat fused by a heat sealing machine, followed by cutting to obtain the endless printing belt for a rotary stamp. The present invention provides a manufacturing method of an endless printing belt for a rotary stamp characterized by the following facts: a sheet prepared by forming a blend of a thermoplastic material doped with at least a water-soluble bubble-forming agent to an upper plate shape is heated at 100°C to 200°C; said heated sheet is set in a mold engraved with only the seating member pattern; then, a base material is set, and a pressing plate is applied for molding; after mold releasing, said water-soluble bubble-forming agent is washed out and the unit is dried; then, the two ends of the sheet are superposed and are heat fused by a heat sealing machine, forming the non-printing portion made of the non-porous protective film on said seating member.

[0005]

Embodiment of the invention

In the following, an explanation will be given in more detail regarding the present invention. According to the present invention, the endless printing belt for a rotary stamp is prepared by forming a seating member made of a hot melt sheet as the base material and having a thermoplastic porous member formed on said hot melt sheet; and the endless printing belt has a non-printing portion made of a non-porous protective film formed on said seating member. A hot melt sheet made of thermoplastic resin that melts at 50°C to 180°C can be used as the base material for use in this invention. Examples of the materials that may be used include polyethylene, polypropylene, polyvinyl chloride, etc. Among them, polyethylene is especially preferred. For the hot melt sheet of the present invention, in order to prevent problems in molding of the endless printing belt, a hot melt sheet free of stretching and without shrinkage under heat when the sheet is formed is used. Either a non-porous or porous sheet may be used as the hot melt sheet of the present invention. When a non-porous sheet is in use, there is no way to feed ink from the inner side of the endless printing belt, so that the ink should be fed from the outer surface of the printing portion. On the other hand, when a porous sheet is in use, ink can be fed from either the inner side of the endless printing belt or the outer surface of the printing portion. From the viewpoint of moldability, adherence and ink permeability, the base material that can be adopted especially preferably for the present invention is a hot melt sheet of polyethylene having a grid-like mesh structure with an insertion rate in the range of 10-30 $g/m^2$, thickness of 0.05-0.50 mm, and mesh hole interval of 1-2 mm. The seating member of the present invention is made of a thermoplastic porous material, mainly a thermoplastic resin that melts at 50°C to 180°C, such as polyethylene, polypropylene, polyvinyl chloride, etc. Especially, polyethylene is preferred. According to the present invention, in order to obtain a porous member having consecutive bubbles, at least a water-soluble bubble-forming agent, such as sodium

chloride, potassium chloride or the like is added into a thermoplastic resin, and the mixture is blended and molded, followed by washing out of said water-soluble bubble-forming agent to form a porous structure. When the porous member is manufactured, one may also add a fine powder of heat generating material that absorbs IR light, such as carbon black, in addition to said water-soluble bubble-forming agent in the mixture for blending. Also, a mixture of thermoplastic resin as a blowing agent may be used to form the consecutive bubbles of the porous member. However, in such case, it is difficult to obtain consecutive bubbles with uniform size, and this is undesirable. According to the present invention, dies engraved only for the seating member, and without engraving for the printing portion, such as letters, graphics, symbols, patterns, or the like, are used. Consequently, for the molded sheet, only the seating member is formed, while the printing portion is not formed at all.

[0006]

When the printing portion is to be formed on said seating member, a positive film having the portion of the desired letters or the like as the black portion and the remainder as the transparent portion and a negative film having the desired letters or the like as the transparent portion and the remainder as the black portion are superposed on said seating member, and IR light is radiated from said film side. As a result, the portion corresponding to the remainder is fused and solidified, forming the non-printing portion with a non-porous protective film where the ink cannot seep out. At the same time, the portion corresponding to the letters or the like is formed as the printing portion where ink can seep out. In this case, when the thermoplastic porous member contains the fine powder of heating material that absorbs the IR light and generates heat, a positive film is formed to form said letters or the like, while when the fine powder of heating material is not contained, a negative film is used to form said letters or the like. In order to form the letters or the like with radiation of IR light, the prior art described in the following patent applications may be adopted: Japanese Kokoku Patent Nos. Sho 53[1978]-43321, Japanese Kokai Patent Application Nos. Hei 6[1994]-155698, Hei 8[1996]-72376, Japanese Patent Application No. Hei 8[1996]-272200, etc. As the other methods for forming the printing portion, the following schemes may be adopted. In one scheme, after the endless printing belt without the printing portion formed on it is assembled in a conventional rotary stamp, dies engraved for the prescribed letters or the like are heated at about 80°C, and the rotary stamp is moved to above the dies while the endless printing belt is rotated, so that the portion corresponding to the remainder other than the letters or the like is fused and solidified, forming the non-printing portion with the non-porous protective film where the ink cannot seep out. At the same time, the portion corresponding to the letters or the like is formed as the printing portion where the ink can seep out. At first, an endless printing belt having only the seating

member and free of the letters or the like formed on it is manufactured, and then, as needed, the desired letters or the like can be formed to form the endless printing belts in the necessary quantity. As a result, there is no need to keep a lot of useless completed products in stock.

[0007]

The endless printing belt of the present invention can be manufactured as follows. A sheet prepared by forming a blend of polyethylene or other thermoplastic material doped with at least a water-soluble bubble-forming agent, such as sodium chloride or potassium chloride, as well as carbon black or other fine powder of heating material as needed to an upper plate shape is heated at 100°C to 200°C; said heated sheet is set in a mold engraved with only the seating member pattern; then, a base material is set, and a pressing plate is applied for molding; after mold releasing, said water-soluble bubble-forming agent is washed out and the unit is dried, forming the non-printing portion made of the non-porous protective film on said seating member; the two ends of the sheet are then superposed and heat fused by a heat sealing machine, followed by cutting to obtain the endless printing belt for a rotary stamp. As another scheme, after drying, the two ends of the sheet are superposed and heat fused by a heat sealing machine. After it is cut to the necessary width, on said seating member, the non-printing portion is formed with a non-porous protective film using the aforementioned method. As explained above, according to the present invention, the sheet formed from the blend doped with the water-soluble bubble-forming agent is heated to manufacture the printing belt. Consequently, the dies may not be heated at all, or they may be kept at a low temperature, and there is no need to heat the dies to a high temperature. Consequently, there is no need to use a high-temperature controller for the dies, and the manufacturing device can be simplified. There is no specific restriction on the material of the dies. In addition to metals, phenolic plate or another material with a melting point of 200°C or higher may be used. Also, the sheet prepared by molding a blend containing the water-soluble bubble-forming agent is heated at 100°C to 200°C, and this is to soften the sheet and to improve its moldability as good as possible. Here, no melting takes place even when heated at 160°C, and it is believed that this is due to addition of the water-soluble bubble-forming agent in the sheet. With regard to the heating method, it may be set on a hot plate, or it may be heated by a microwave. Any method that can heat the entire sheet may be adopted, and there is no specific restriction on it. In this manufacturing method, after wash-out of the water-soluble bubble-forming agent, the two ends of the sheet are superposed for heat fusion by a heat sealing machine. Because the material is a thermoplastic resin instead of rubber or other thermosetting resin, there is no need to apply any special adhesive, and heat fusion can be performed as is. This is an advantage.

[0008]

For the base material of said endless printing belt for a rotary stamp, when the hot melt sheet is reinforced with a reinforcing material, it is possible to obtain an even better endless printing belt. Examples of the reinforcing materials mainly include plain woven or twill woven cloths made of cotton, silk, rayon, nylon, polyester, and other fibers. Various types of cloths made of fibers ranging from the extremely fine synthetic fibers with fiber size of 1 d or smaller to natural fibers with fiber size of 100 d or larger may be used. With regard to the hot melt sheet and thermoplastic porous member, the same types as mentioned above may be used. In this case, of course, the hot melt sheet works as the base material. However, not only the synthetic fibers, but also cotton and other natural fibers also can be bonded with a high strength, the hot melt sheet also works as an adhesive between the reinforcing material and thermoplastic porous member.

[0009]

Application examples

In the following, an explanation will be given in more detail regarding application examples of the present invention. Figure 1 is a diagram illustrating Application Example 1. Here, (2) represents the base material made of a hot melt sheet, a 0.2-mm-thick porous polyethylene sheet that melts at 70°C. The hot melt sheet is selected such that the sheet is formed without stretching, and it does not shrink by heat. As a result, it is possible to prevent problems in molding of the endless printing belt. (4) represents a seating member made of porous polyethylene that melts at 70°C. On said seating member (4), printing portion (5) and non-printing portion (6) are formed. Said non-printing portion (6) is formed by fusing and solidifying the porous polyethylene at the portion corresponding to the remainder other than the letters or the like to form a non-porous protective film where no ink can seep out, while said printing portion (5) is left for the portion corresponding to the letters or the like without fusion and solidifying so that ink can seep out there. By means of fusing and solidifying porous polyethylene, there is a difference in height between printing portion (5) and non-printing portion (6) of about 0.01-1.0 mm. In the following, an explanation will be given regarding the manufacturing method of this application example. First, a fine powder of sodium chloride and carbon black are added into polyethylene resin, and the mixture is blended to form a 2-mm-thick plate-shape sheet. Then, the plate-shape sheet is heated by a hot plate to 140°C. Then, said heated plate-shape sheet is set in the dies engraved only for the seating member and coated with a mold releasing agent, and then a 0.2-mm-thick hot melt sheet made of porous polyethylene is set, followed by setting a pressing plate for applying a pressure of 200 $kg/cm^2$ for 30 sec of molding operation on a press. Then, the mold is released, and the molded sheet is removed. The

molded sheet is then dipped in warm water to wash out and fully remove sodium chloride, followed by drying. After it is well dried, a positive film having the desired letters or the like as the black portion and with the remainder as the transparent portion is applied superposed on said seating member, followed by radiation of IR light from the film side. As a result, the IR light passes through the transparent portion of the positive film, so that carbon of the corresponding portion is heated, the sheet is melted and solidified to form a non-porous protective film. On the other hand, for the black portion of the positive film, heat generated by the IR light is not transmitted to the porous member in the corresponding portion up to the melting temperature, so that the porous member is left as is. Consequently, a printing portion where ink can seep out and a non-printing portion where ink cannot seep out are formed on the seating member. Then, the two ends of the sheet are superposed for heat fusion by a heat sealing machine. The obtained [member] is cut to the desired width, forming the endless printing belt in this application example. Then, ink is fed by dripping from the base material side of said endless printing belt, and it is assembled onto a conventional rotary stamp for use. Here, the fine powder of sodium chloride is added in polyethylene resin that melts at 70°C to form a plate-shape sheet that does not melt even when heated to 140°C although the reasons for this are unclear.

[0010]

Figure 2 is a diagram illustrating Application Example 2. Here, (2) represents the base material made of a hot melt sheet, a 0.5-mm-thick porous polyethylene sheet that melts at 80°C. The hot melt sheet is selected such that the sheet is formed without stretching, and it does not shrink by heat. As a result, it is possible to prevent problems in molding of the endless printing belt. (4) represents a seating member made of porous polyethylene that melts at 80°C. On said seating member (4), printing portion (5) and non-printing portion (6) are formed. Said non-printing portion (6) is formed by fusing and solidifying the porous polyethylene at the portion corresponding to the remainder other than the letters or the like to form a non-porous protective film where no ink can seep out, while said printing portion (5) is left for the portion corresponding to the letters or the like without fusion and solidifying so that ink can seep out there. By means of fusing and solidifying porous polyethylene, there is a difference in height between printing portion (5) and non-printing portion (6) of about 0.01-1.0 mm. (3) represents a reinforcing material made of plain woven cotton cloth using 120-count double yarns with a density of 120 yarns/in for both warps and wefts. In the following, an explanation will be given regarding the manufacturing method of Application Example 2. First, a fine powder of sodium chloride is added into polyethylene resin, and the mixture is blended to form a 2-mm-thick plate-shape sheet. Then, the plate-shape sheet is heated by a hot plate to 140°C. Then, said heated plate-shape sheet is set in the dies engraved only for the seating member and coated with

a mold releasing agent, and then a 0.5-mm-thick hot melt sheet made of polyethylene porous member is set, and then said plain woven cotton cloth made of 120-count double yarns with density of 120 yarns/in in both warp and weft is set, followed by setting a pressing plate for applying a pressure of 200 $kg/cm^2$ for 30 sec of molding operation on a press. Then, the mold is released, and the molded sheet is removed. The molded sheet is then dipped in warm water to wash out and fully remove the sodium chloride, followed by drying. After it is well dried, the two ends of the molded sheet are superposed for heat fusion by a heat sealing machine. The obtained [member] is cut to the desired width, and [the endless printing belt] is assembled in a rotary stamp. Then, dies with the desired letters or the like engraved for them are heated at about 80°C, and the rotary stamp is moved onto it while the endless printing belt is rotated, so that the remainder other than the portion of the letters or the like is fused and solidified to form a non-porous protective film where ink cannot seep out, and at the same time, the portion of the letters or the like is left as is so that ink can seep from this portion. As a result, the endless printing belt of this application example is obtained. Then, ink is applied dropwise from the surface of the printing portion onto each printing portion, and the endless printing belt is assembled in the conventional rotary stamp for use. Here, of course, the hot melt sheet works as a base material. Also, as it is bonded with high strength to the cotton cloth, it also works as an adhesive between the reinforcing material and the thermoplastic porous member.

[0011]
Effect

According to the present invention, when a thermoplastic material is used in forming the endless printing belt for a rotary stamp, by selecting a hot melt sheet as the base material, even when used for a long time, there is still no separation of the seating member, and the endless printing belt can be used with a long lifetime in practical application. Also, after manufacturing of the seating member free of the printing portion, when needed, letters or the like can be formed on the endless printing belts in a prescribed quantity. Consequently, there is no need to hold many of the completed products in stock. Also, according to the present invention, the dies are not heated, and the endless printing belt is manufactured by heating a sheet formed to sheet shape from a blend doped with the water-soluble bubble-forming agent, so that there is usually no need to use an expensive temperature controller, and the manufacturing device can be made simpler. Also, there is no specific restriction on the dies, and any type with a melting point of 200°C or higher can be used. According to the present manufacturing method, after the water-soluble bubble-forming agent is washed out, the two ends of the sheet are superposed and heat fused by a heat sealing machine. Because the material is a thermoplastic resin, no special adhesive is needed, and heat fusion can be performed as is. This is also an advantage.

[0012]

Brief description of the figures

Figure 1 is a diagram illustrating the endless printing belt in Application Example 1.

Figure 2 is a diagram illustrating the endless printing belt in Application Example 2.

Explanation of the reference symbols

1 Endless printing belt
2 Base material
3 Reinforcing material
4 Seating member
5 Printing member
6 Non-printing portion

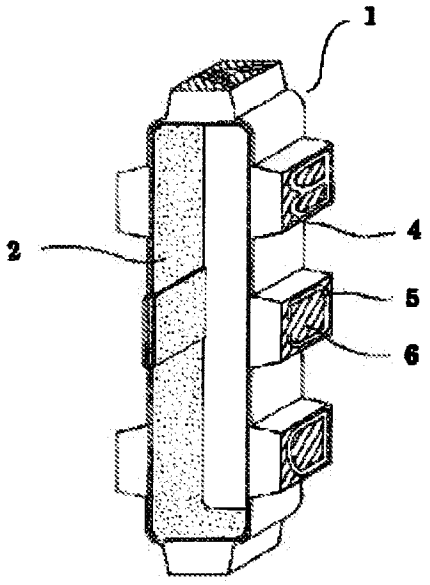



Figure 1

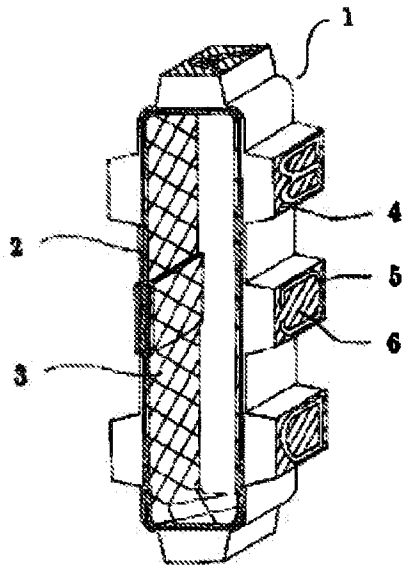



Figure 2